GUIDELINES TO PREPARE FOR YOUR NUTRIENT MANAGEMENT PLAN

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REQUIRED ITEMS FOR CERTIFIED NUTRIENT MANAGEMENT PLANS

INTRODUCTION

The purpose of a nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) Assure proper containment of animal manure and process waste water.
2) Assess resource concerns which exist on the property.
3) Budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop residues, and irrigation water.
4) Assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. In very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue). Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it is decomposed. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses potentially transmitted through water by animal manure are Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can impact surface and groundwater resources.

CERTIFIED NUTRIENT MANAGEMENT PLAN REQUIREMENTS

The following is a list of requirements for nutrient management plans for Idaho dairy producers.

OWNER FACILITY INFORMATION

- ❑ Name of facility
- ❑ Owner/Operator of facility
- ❑ Address of facility
- ❑ Phone number of owner/operator
- ❑ Legal description of facility (include all owned land used for application of waste):
  Name of facility:_____ Section_____ Township_____ Range_____

  Name of facility:_____ Section_____ Township_____ Range_____

HYDROLOGY

Surface water has water quality standards based on the designated use of the water body. These water quality standards must be met or the water body is listed as water quality impaired (303d list) and falls under a regulatory process to bring the water quality back to the accepted standards. The following surface water information will be required in your nutrient management plan.

- ❑ The nearest down-slope stream from your facility (if applicable):_____
- ❑ Is the stream on the Environmental Protection Agency's 303(d) list? Yes_____ No_____

  If yes, what are the listed contaminants?_____
- ❑ 4th order watershed Hydrologic Unit Code (8 digit):_____

SOIL TESTING INFORMATION

ISDA-Dairy Bureau regulation uses soil test phosphorus as the indicator for environmental impact from agricultural production practices. The regulations are based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of nutrients.

- ❑ Fields with no runoff: if the water table is greater than 5 feet from ground surface, TH = 30 ppm (Olsen P method, 18-24" soil depth).
- ❑ Fields with no runoff: if the water table is less than 5 feet from ground surface, TH = 20 ppm (Olsen P method, 18-24" soil depth).
- ❑ Fields with runoff: TH = 40 ppm (Olsen P method, 0-12" soil depth).

If soil test phosphorus is below TH, regulations allow for land application of nitrogen equal to rates recommended by the University of Idaho Fertilizer Guides or another accredited database. The regulations identify no agronomic advantage to nutrient application on soils at or above TH, however, they allow for land application of animal manure at rates equal to crop uptake of phosphorus at soil test levels above TH. ISDA regulatory soil testing on livestock operations will be conducted every three years to determine trend data, based on TH.

Unless a shortage of acreage exists for land application of manure, it is recommended to have your nutrient management plan written for land application of solid and liquid manure to the rate of crop uptake. Application of the manure resource to this rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by your nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- ❑ Spring soil test for nitrogen (required annually)
  0-12" and 12-24" nitrogen test
- ❑ Soil test for phosphorus (optional if plan written for land application of manure at the rate of crop uptake, required if plan is written for land application of manure above crop uptake)
  depths required if plan written for land application of manure above crop uptake:
  0-12": for all fields
  18-24": additional requirement for fields with no runoff
- ❑ Other parameters (optional)

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
pH			

Additional soil test tables are provided in Appendix A.

SITE MAPS

Two site maps are required in a certified nutrient management plan – the Facility Site Plan and the Land Application Site Plan. See Figure 1 for example Facility Site Plans, and Figure 2 for example Land Application Site Plans.

❑ Facility Site Plan

Required items on the map:

Livestock:

- ❑ Milk barn
- ❑ Livestock housing and corrals
- ❑ Waste structures
- ❑ Lagoon(s)
- ❑ Separator(s)
- ❑ Solid storage
- ❑ Liquid manure pump station
- ❑ Liquid manure pipelines
- ❑ Feed storage

Hydrologic Features:

- ❑ Drain ditches
- ❑ Springs
- ❑ Seeps
- ❑ Runoff flow direction
- ❑ Runoff containment
- ❑ Waterways (streams, rivers, creeks)
- ❑ Ponds
- ❑ Lakes
- ❑ Wetlands

Other Features:

- ❑ Residences
- ❑ Property lines
- ❑ Wells
- ❑ North arrow
- ❑ Rock outcrops
- ❑ Sink holes
- ❑ Fences
- ❑ Berms
- ❑ Potable water pipelines

❑ Land Application Site Plan

Required items on the map:

- ❑ Dairy location
- ❑ Labeled fields with name and acreage
- ❑ Labeled roads and other landmarks

Hydrologic Features:

- ❑ Injection well
- ❑ Residential wells
- ❑ Drain ditches
- ❑ Tile drain outlets
- ❑ Springs
- ❑ Seeps
- ❑ Runoff flow direction
- ❑ Groundwater flow direction
- ❑ Berms
- ❑ Runoff containment
- ❑ Waterways (streams, rivers, creeks)
- ❑ Ponds
- ❑ Lakes
- ❑ Wetlands

Irrigation Features:

- ❑ Wells
- ❑ Canals/laterals
- ❑ Pump station
- ❑ Pipeline
- ❑ Sediment pond
- ❑ Buffer strip
- ❑ Chemigation system

Other Features:

- ❑ Residences
- ❑ Property lines
- ❑ Wells
- ❑ North arrow
- ❑ Rock outcrops
- ❑ Sink holes
- ❑ Fences
- ❑ Berms

FIELD & CROP INFORMATION

❑ Crop Rotation information for each field.

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

Additional crop information data tables are provided in Appendix B.

FERTILIZER PLACEMENT AND TIMING

❑ Phosphorus Fertilizer Placement: check which applies
- ❑ Phosphorus fertilizer placed with a planter or plowed deeper than 2 inches
- ❑ Phosphorus fertilizer incorporated greater than 3 inches by disking or chiseling
- ❑ Phosphorus fertilizer surface applied, no incorporation
- ❑ Phosphorus fertilizer surface applied on frozen ground

❑ Organic Phosphorus (manure/biosolids) Fertilizer Placement: check which applies
- ❑ Organic phosphorus injected or plowed deeper than 2 inches
- ❑ Organic phosphorus incorporated greater than 3 inches by disking or chiseling
- ❑ Organic phosphorus incorporated less than 3 inches by harrowing, etc.
- ❑ Organic phosphorus surface applied, no incorporation
- ❑ Organic phosphorus surface applied on frozen ground

❑ Nitrogen fertilizer application timing: check which applies
- ❑ No nitrogen fertilizer applied
- ❑ Nitrogen fertilizer application split with nitrification inhibitor
- ❑ Nitrogen fertilizer application split with some applied pre-plant and some applied during the growing season.
- ❑ Nitrogen fertilizer application pre-plant in the Spring
- ❑ Nitrogen fertilizer application pre-plant in the Fall

IRRIGATION INFORMATION

Irrigation water management is very important in nutrient management. If irrigation water is over-applied what the crop uses, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop evapotranspiration rate. Proper irrigation water management responds to these crop demands.

Information your Nutrient Management Planner will need:

- ❑ *Wheel lines/handlines (per field, per crop)*

  Field name:_____ Acres:_____

  Crop:_____

  Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)

  Number of nozzles:_____

  Number of days to completely irrigate field:_____

  Down time per day:_____ (hrs) Days between irrigation:_____

  System application efficiency:_____ (%) Estimated runoff:_____ (%)

- ❑ *Pivot (per field, per crop)*

  Field name:_____ Acres:_____

  System flow rate:_____ (gpm)

  Pivot lateral length:_____ (ft) System application efficiency:_____ (%)

  Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)

  Days between irrigation:_____

- ❑ *Surface Irrigation (per field, per crop)*

  Field name:_____ Acres:_____ Slope of field:_____(%)

  Condition of field at the end of the furrows:

  ❑ Less than 6 inches from field level grade to bottom of tail water ditch

  ❑ More than 6 inches from field level grade to bottom of tail water ditch

  Delivery Method: ❑ Gated pipe ❑ Siphon tubes ❑ Earthen ditch with cutouts

  Longest furrow length:_____ (ft) Furrow border spacing:_____ (ft)

  Time to reach end of furrow:_____ (hrs) Furrow flow rate:_____ (gpm) *OR*

  Gated pipe: Width of opening:_____ (in) Height of opening:_____ (in)

  Elevation difference between head ditch water surface and gate:_____ (in)

  Siphon tube: Tube diameter:_____ (in) Number of tubes per furrow:_____

  Elevation difference between head ditch water surface and furrow:_____ (in)

  Set time for single furrow run:_____ (hrs)

  Days between irrigation:_____

Additional irrigation information data sheets are provided in Appendix C.

BEST MANAGEMENT PRACTICE INFORMATION

Best management practices help to decrease the amount of erosion off the field and leaching below the root zone. Your Nutrient Management Planner will want to know if you have BMPs on your fields.

Enter field name, and check all best management practices that apply to that field:

Field Name	Sediment Pond	PAM - Full Season	PAM - Part Season	Straw Mulching - Full Season	Straw Mulching - Part Season	Buffer Strip	Alfalfa Hay or Seed (> 1 Season)	Irrigation Water Management w/ cutback	Irrigation Water Management w/o cutback	Surge Irrigation	Chiseling & Subsoiling	Cross-slope Farming	Strip Cropping	Terracing

RESOURCE CONCERN INFORMATION

❑ **Field Resource Concerns:**

There may be physical features on your fields which may increase the potential for nutrient transport to surface or ground water. The following are resource concerns nutrient management planners look for on each field.

1. **Irrigation Canals/Laterals –** Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.
2. **Wetlands –** Typically wetlands are low-lying areas of groundwater discharge with water loving plants. Nutrient introduction into wetlands increases the potential of groundwater and surface water contamination.
3. **Surface Waters** (Streams/Lakes/Springs)
4. **Sink Holes –** Sink holes are low-lying areas which may collect runoff and/or irrigation water. They may be areas of increased water and contaminant movement to groundwater.
5. **Rock Outcrops –** Rock outcrops are areas where there is exposed rock with little soil. They may be direct links to groundwater through cracks and fissure. Nutrients should not be applied on rock outcrops unless the outcrop has been sealed. Sealing methods include one foot of compacted soil with 15% clay content or gypsum sealing.
6. **Groundwater Discharge Zones –** Groundwater discharge zones are areas in the field where groundwater table surfaces typically during the spring or during irrigation season. Nutrient

introduction into these areas strongly increases the vulnerability of groundwater contamination.

7. **Well Heads –** Well heads offer a direct link to groundwater. If well heads receive runoff from animal corrals or agricultural fields the potential for groundwater contamination is very high. Runoff should be diverted from the well head and new wells should be properly placed up gradient from contamination sources, following all state and federal setbacks.
8. **Subsurface Tile Drains –** Subsurface drains can deliver nutrients to surface water. Subsurface drains run the risk of decreased time for contact of the nutrients to adsorb onto soil particles or to be utilized by the crop. Irrigation management is also affected because shallow soils have a lower water holding capacity.
9. **Limiting Layers –** Limiting layers in the soil such as a hard pan or rock decrease the depth of soil in which the crop will grow. Shallow soils run the risk of decreased time for contact for the nutrients to adsorb onto soil particles or to be utilized by the crop causing the potential for runoff or leaching.

Enter field name, then check all resource concerns that apply to that field:

Field Name	Distance to Canals/ Laterals (ft)	Distance to Wetland (ft)	Distance to Surface Water (ft)	Sink Hole (Y/N)	Rock Outcrop (Y/N)	Groundwater Discharge Zone (Y/N)	Well Head (Y/N)	Tile Drain (Y/N)	Runoff Leaves Field (Y/N)	Limiting Layers (Y/N)

❑ **Well Test:**

Nutrient Management Planners typically provide the latest well test information in the Nutrient Management Plan. The Idaho State Department of Agriculture has tested the wells of every dairy in Idaho. Dairy producers were provided with the report of that test.

Well Test Information (if applicable)

Well Name	Test Date	Nitrate (ppm)	Nitrite (ppm)	Ammonia (ppm)	Bacteria (present)	Sodium (ppm)	TDS (ppm)	Hardness	EC (uS/cm)	pH

LIVESTOCK INFORMATION

Nutrient Management Planners estimate annual manure production based on animal type, animal weight, and number of animals. The nutrient content of manure (N,P,K) is estimated from animal type and bodyweight. Fill out the form below for each class of livestock on your operation. Proportioning annual bedding needs between classes of livestock may not be possible. At minimum, estimate the total annual amount of bedding used on your operation.

Animal Class	Housing Type	Number of Animals	Average weight per animal (lbs)	Bedding Type	Tons of bedding used/yr	No. days per year housed in this unit
Lactating Cow						
Dry Cow						
Heifer						
Calf						

MANURE HANDLING

Lactating Cows

1. Do you flush feed alley area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
2. Do you scrape feed alley? Yes_____ No_____
3. Do you flush animal housing/bedding area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
4. Do you scrape animal housing/bedding area? Yes_____ No_____
5. Do you flush or hose milk parlor? Yes_____ No_____
6. Do you scrape and hose milk parlor? Yes_____ No_____
7. Do you flush or hose holding pen? Yes_____ No_____
8. Do you scrape holding pen? Yes_____ No_____

9. Do you have separators? Yes_____ No_____

If yes, check the order the separators operate in relation to liquid manure before it reaches the holding pond:

	1st	2nd	3rd
Gravity Concrete Separator	❑	❑	❑
Gravity Earthen Separator	❑	❑	❑
Sloped Screen Mechanical Separator	❑	❑	❑
Mechanical Separator	❑	❑	❑
Double Screen Mechanical Separator	❑	❑	❑
Screw Press Separator	❑	❑	❑

10. What are the measurements for your solid manure storage(s)?

_____ _____width (ft) _____length (ft) _____wall height (ft)

_____ _____width (ft) _____length (ft) _____wall height (ft)

_____ _____width (ft) _____length (ft) _____wall height (ft)

_____ _____width (ft) _____length (ft) _____wall height (ft)

11. How frequently do you empty out the solid manure storage? _____ times/year

12. What type of manure spreader do you use and what is the size?

Type_____ Width_____ Length_____ Fill height_____ Rated Capacity_____

13. What type of storage facility do you have for liquid waste from the parlor?

_____ earthen storage _____ concrete tank

14. What are the dimensions on your liquid waste storage facility?

Earthen storage: width (ft)_____ length (ft)_____ depth (ft)_____ wall slope_____

Concrete tank: width (ft)_____ length (ft)_____ wall height (ft)_____

15. What is the design volume for your liquid waste storage facility? _____ cubic feet

16. How do you empty your liquid waste storage facility?

_____ evaporative pond, not emptied

_____ pump to_____

_____ gravity flow to_____

_____ honey wagon

Dry Cows:

1. Are feed alleys scraped into a storage structure? Yes_____ No_____
2. What is the frequency of cleaning out the bedded manure pack? _____times/year
3. Do you flush feed alley area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
4. Do you scrape animal housing/bedding area? Yes_____ No_____
5. What is the frequency of cleaning out the bedded manure pack? _____times/year
6. Do you flush animal housing/bedding area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
7. Is solid manure composted? Yes_____ No_____
8. Do dry cows go out on pasture during the summer? Yes_____ No_____
   If yes, for how many hours per day? _____ hours
   for how many months of the year? _____ months
9. Do dry cows have access to a dirt exercise lot? Yes_____ No_____
   If yes, for how many hours per day? _____ hours
   for how many months of the year? _____ months
   frequency of manure removal _____ months

Young Stock:

1. Are feed alleys scraped into a storage structure? Yes_____ No_____
2. What is the frequency of cleaning out the bedded manure pack? _____times/year
3. Do you flush feed alley area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
4. Do you scrape animal housing/bedding area? Yes_____ No_____
5. What is the frequency of cleaning out the bedded manure pack? _____times/year
6. Do you flush animal housing/bedding area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
7. Is solid manure composted? Yes_____ No_____
8. Do heifers go out on pasture during the summer? Yes_____ No_____
   If yes, for how many hours per day? _____ hours
   for how many months of the year? _____ months
9. Do heifers have access to a dirt exercise lot? Yes_____ No_____
   If yes, for how many hours per day? _____ hours
   for how many months of the year? _____ months
   frequency of manure removal _____ months

Other Livestock:

1. Are feed alleys scraped into a storage structure? Yes_____ No_____
2. What is the frequency of cleaning out the bedded manure pack? _____times/year
3. Do you flush feed alley area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
4. Do you scrape animal housing/bedding area? Yes_____ No_____
5. What is the frequency of cleaning out the bedded manure pack? _____times/year
6. Do you flush animal housing/bedding area? Yes_____ No_____
   If yes, is recycled lagoon water used to flush? Yes_____ No_____
7. Is solid manure composted? Yes_____ No_____
8. Do animals go out on pasture during the summer? Yes_____ No_____
   If yes, for how many hours per day? _____ hours
   for how many months of the year? _____ months
9. Do animals have access to a dirt exercise lot? Yes_____ No_____
   If yes, for how many hours per day? _____ hours
   for how many months of the year? _____ months
   frequency of manure removal _____ months

DAILY WATER USE IN THE MILKING CENTER

Your Nutrient Management Planner needs to estimate the volume of liquid dairy waste produced on your farm. This worksheet provides the necessary calculations for estimating the amount of liquid waste produced per day.

Pipeline Cleaning. Most dairy operations fill their cleaning vat four times per milking with a pre-milking sanitizing, post-milking rinse, detergent cycle, and acid rinse. The equation for calculating pipeline cleaning volume is shown below. You will need to measure the volume of water that is used for each cycle.

_____ x _____ x _____ = _____ gal/day
# of cycles/milking gallons/cycle # of milkings/day

Clean Bulk Tank(s). The amount of water used to clean a bulk tank varies depending on whether the tank is cleaned manually or with an automatic washer. Approximately 30 to 50 gallons are used to manually wash bulk tanks. A refined estimate is possible by calculating water flow rate from the hose and estimating the number of minutes used to spray the tank (calculation similar to parlor wash-up below). Automatic washers use 60 to 120 gallons per wash. Your milking equipment dealer can provide a water use estimate for your particular automatic tank washer.

Tank 1 _____ / _____ = _____ gal/day
gal/wash days between pickups

Tank 2 _____ / _____ = _____ gal/day
gal/wash days between pickups

Wash Parlor Floor. The amount of water used to clean the parlor floor varies tremendously between dairies.

Hose: Water use can be estimated by the equation below. In general, you will use 5 gallons of water per minute from a conventional pressure system and 20 gallons per minute from a booster pump system. You can refine your estimate by timing how long it takes to fill a 5 gallon bucket with water.

_____ x _____ x _____ = _____ gal/day
gal/min from hose | min washdown | # wash/day

Flush: Water use can be estimated by the equation below.

_____ x _____ x _____ = _____ gal/day
total flowrate (gpm) | min flush | # flush/day

Deck Flush: Water use can be estimated by the equation below.

_____ x _____ x _____ x _____ = _____ gal/day
nozzle flowrate (gpm) | # of nozzles | min flush | # flush/day

Wash Milkhouse Floor. Many dairy producers wash the milk room flow by catching water used to clean the pipeline in bucket(s) and then bucket washing the floor. In this situation, there is no additional water used to wash the milk room floor. Other producers spray down the milk room with a hose. Use the equation below to estimate water use for this task.

_____ x _____ x _____ = _____ gal/day
gal/min from hose | min washdown | # wash/day

Pre-Cooling Milk. Substantial amounts of "waste water" can be generated from a plate cooler or pre-cooler. As a general rule, one gallon of water is used to pre-cool one gallon of milk. Most dairies recycle the pre-cooler water for other purposes (example pre-cool milk then flow to a water trough). The volume of water must be considered in lagoon sizing if it is not recycled for other uses.

a) Does your parlor have a plate cooler or pre-cooler? Yes_____ No_____

b) Do you recycle pre-cooler/plate cooler water? Yes_____ No_____

If yes to b, how is it recycled?

_____ diverted to water trough

_____ diverted to holding tank

_____ other: describe_____

_____

_____

_____

If no to b, then calculate the volume added to storage:

_____ x _____ = _____ gal/day
gal milk shipped/day | gal of water/gal of milk cooled

Preparing Cows for Milking. Dairies that pre-dip cows generally use water on only a few cows per milking. Herds which manually wash udders will use ¼ to 1 gallon of water per cow per milking. Use the higher estimate if "liberal amounts" are used to prep cows.

a) Do you pre-dip your cows? Yes_____ No_____

b) Do you manually wash cows prior to milking? Yes_____ No_____

If yes, calculate water use below:

_____ x _____ x _____ = _____ gal/day
cows | gal/wash | # milkings/day

c) Do you use holding pen sprinklers to wash cows prior to milking?

If yes:

_____ x _____ x _____ = _____ gal/string
sprinklers | sprinkler flowrate in holding pen | min/wash (gpm)

_____ x _____ = _____ gal/day
# of strings | gal/string

d) Are sprinklers on a timer? Yes_____ No_____

If you are designing storage for a 6 months period of time, it is important to accurately account for months sprinklers are in use, so storage is not over-estimated:

Months sprinklers are used (circle months used):

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec All

Backflushing Milking Units. Approximately ¼ to ½ gallon of water is used to manually backflush milking units. Automatic backflush units will use 1 to 4 gallons per backflush cycle. You can refine the estimate for your dairy by catching the water used to backflush a unit in a 5 gallon bucket.

a) Do you manually backflush milking units between cows? Yes_____ No_____

b) Do you use automatic backflush units in your parlor? Yes_____ No_____

If yes to a or b, use the equation below to estimate water use:

_____ x _____ x _____ = _____ gal/day
cows | gal/backflush | # milkings/day

Cleaning the Holding Pen. Large volumes of waste water are generated if the holding pen is washed down with a hose or cleaned with a flush system.

a) Do you wash down your holding pen with a hose? Yes_____ No_____

If yes, perform the calculation below:

_____ x _____ x _____ = _____ gal/day
gal/min from hose | min/washdown | # washdown/day

b) Do you flush your holding pen? Yes_____ No_____

If yes, perform the calculation below:

_____ x _____ = _____ gal/day
gal/flush | # flush/day

Miscellaneous Equipment.

a) Do you have a water cooled compressor for your cooling milk? Yes_____ No_____

If yes, is the water from the compressor returned to a floor drain? Yes_____ No_____

If yes, water use should be estimated: = _____ gal/day

b) Do you use a washing machine in the milking center? Yes_____ No_____

If yes, water use should be estimated:

_____ x _____ = _____ gal/day
loads/day | gal/load

c) Do you have a water ring vacuum pump? Yes_____ No_____

If yes, is the water discharged to the floor drain? Yes_____ No_____

If yes, water use should be estimated: = _____ gal/day

Miscellaneous Uses. A "fudge" factor is typically added to cover items not listed above. Two common examples include: cleaning calf bottles and washing off boots.

Miscellaneous: _____ gal

Total daily water use: _____ gal/day

RUNOFF AREA

Unsurfaced (Dirt) Lots

On all dairies, liquid storage ponds are sized to contain contaminated runoff from cow yards, feed lanes, and feed storage areas. The volume of runoff is dependent on the type of surface and the slope. Your Nutrient Management Planner will need to know if runoff is diverted to your liquid waste storage.

a) Do you have livestock on dirt lots? Yes_____ No_____

b) What are the dimensions on the dirt lots and approximate slope?_____

c) How do you contain runoff from these dirt lots (berm, contained in lot, diverted to storage pond)?

Housing or feed storage description	Width (ft)	Length (ft)	Slope (< 2% or >2%)	Containment of lot runoff

Concreted or Surfaced Areas

On all dairies, liquid storage ponds are sized to contain contaminated runoff concrete feed lanes, feed storage/preparation areas, cow walkways and holding pen. If runoff is diverted from these areas to your storage pond, this needs to be known.

Concrete area description	Width (ft)	Length (ft)	Containment of runoff

Direct precipitation on buildings can become contaminated by flowing through cow corrals and or feed storage. If it does, it needs to be contained. Identify buildings that contribute runoff to cow corrals/cow housing.

Building or structure description	Roof width (ft)	Roof length (ft)	Containment of runoff

Describe your procedures for diverting clean runoff away from livestock confinement areas, or other buildings and structures.

Housing, or structure description	Method of diverting runoff

APPENDIX A

SOIL TEST DATA SHEETS

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
PH			

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
PH			

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
PH			

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
PH			

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
PH			

Field Name:_____ **Acres:**_____
Soil Test Date:_____
Phosphorus Test Method:_____

Soil Test Parameter	0-12"	12-24"	18-24" (required if no runoff from field)
$N0_3$-N			
NH_4-N			
P			
P_20_5			
% Lime			
% Organic Matter			
EC			
PH			

APPENDIX B

CROP INFORMATION DATA TABLES

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

Field Name:_____ **Acres:**_____

Crop Year	Crop	Yield	Will you apply manure to this crop?	*Crop Residue Management	Date Planted	Date Harvested
2000						
2001						
2002						
2003						
2004						
2005						

***Crop residue management options:** 1) residue removed with harvest; 2) residue incorporated early Fall; 2) residue incorporated late Fall or Spring; 3) residue left unincorporated (no till); 4) residue burned.

APPENDIX C

IRRIGATION INFORMATION DATASHEETS

- [ ] *Wheel lines/handlines (per field, per crop)*
  Field name:____________________________________Acres:_________________________
  Crop:____
  Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
  Number of nozzles:_____
  Number of days to completely irrigate field:_____
  Down time per day:_____ (hrs) Days between irrigation:_____
  System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
  Field name:____________________________________Acres:_________________________
  Crop:____
  Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
  Number of nozzles:_____
  Number of days to completely irrigate field:_____
  Down time per day:_____ (hrs) Days between irrigation:_____
  System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
  Field name:____________________________________Acres:_________________________
  Crop:____
  Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
  Number of nozzles:_____
  Number of days to completely irrigate field:_____
  Down time per day:_____ (hrs) Days between irrigation:_____
  System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
  Field name:____________________________________Acres:_________________________
  Crop:____
  Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
  Number of nozzles:_____
  Number of days to completely irrigate field:_____
  Down time per day:_____ (hrs) Days between irrigation:_____
  System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
Field name:____________________________________Acres:_________________________
Crop:____
Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
Number of nozzles:_____
Number of days to completely irrigate field:_____
Down time per day:_____ (hrs) Days between irrigation:_____
System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
Field name:____________________________________Acres:_________________________
Crop:____
Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
Number of nozzles:_____
Number of days to completely irrigate field:_____
Down time per day:_____ (hrs) Days between irrigation:_____
System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
Field name:____________________________________Acres:_________________________
Crop:____
Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
Number of nozzles:_____
Number of days to completely irrigate field:_____
Down time per day:_____ (hrs) Days between irrigation:_____
System application efficiency:_____ (%) Estimated runoff:_____ (%)

- [ ] *Wheel lines/handlines (per field, per crop)*
Field name:____________________________________Acres:_________________________
Crop:____
Nozzle flow rate:_____ (gpm) *OR* Nozzle diameter:_____ (in) Pump pressure:_____ (psi)
Number of nozzles:_____
Number of days to completely irrigate field:_____
Down time per day:_____ (hrs) Days between irrigation:_____
System application efficiency:_____ (%) Estimated runoff:_____ (%)

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Pivot (per field, per crop)*
Field name:____________________________________Acres:_________________________
System flow rate:_____ (gpm)
Pivot lateral length:_____ (ft) System application efficiency:_____ (%)
Time to complete one cycle:_____ (hrs) Estimated runoff:_____ (%)
Days between irrigation:_____

❑ *Surface Irrigation (per field, per crop)*

Field name:_____Acres:_____Slope of field:_____(%)

Condition of field at the end of the furrows:

❑ Less than 6 inches from field level grade to bottom of tail water ditch

❑ More than 6 inches from field level grade to bottom of tail water ditch

Delivery Method: ❑ Gated pipe ❑ Siphon tubes ❑ Earthen ditch with cutouts

Longest furrow length:_____ (ft) Furrow border spacing:_____ (ft)

Time to reach end of furrow:_____ (hrs) Furrow flow rate:_____ (gpm) *OR*

Gated pipe: Width of opening:_____ (in) Height of opening:_____ (in)

Elevation difference between head ditch water surface and gate:_____ (in)

Siphon tube: Tube diameter:_____ (in) Number of tubes per furrow:_____

Elevation difference between head ditch water surface and furrow:_____ (in)

Set time for single furrow run:_____ (hrs)

Days between irrigation:_____

❑ *Surface Irrigation (per field, per crop)*

Field name:_____Acres:_____Slope of field:_____(%)

Condition of field at the end of the furrows:

❑ Less than 6 inches from field level grade to bottom of tail water ditch

❑ More than 6 inches from field level grade to bottom of tail water ditch

Delivery Method: ❑ Gated pipe ❑ Siphon tubes ❑ Earthen ditch with cutouts

Longest furrow length:_____ (ft) Furrow border spacing:_____ (ft)

Time to reach end of furrow:_____ (hrs) Furrow flow rate:_____ (gpm) *OR*

Gated pipe: Width of opening:_____ (in) Height of opening:_____ (in)

Elevation difference between head ditch water surface and gate:_____ (in)

Siphon tube: Tube diameter:_____ (in) Number of tubes per furrow:_____

Elevation difference between head ditch water surface and furrow:_____ (in)

Set time for single furrow run:_____ (hrs)

Days between irrigation:_____

❑ *Surface Irrigation (per field, per crop)*

Field name:_____Acres:_____Slope of field:_____(%)

Condition of field at the end of the furrows:

❑ Less than 6 inches from field level grade to bottom of tail water ditch

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Delivery Method: ❑ Gated pipe ❑ Siphon tubes ❑ Earthen ditch with cutouts

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Time to reach end of furrow:_____ (hrs) Furrow flow rate:_____ (gpm) *OR*

Gated pipe: Width of opening:_____ (in) Height of opening:_____ (in)

Elevation difference between head ditch water surface and gate:_____ (in)

Siphon tube: Tube diameter:_____ (in) Number of tubes per furrow:_____

Elevation difference between head ditch water surface and furrow:_____ (in)

Set time for single furrow run:_____ (hrs)

Days between irrigation:_____

❑ *Surface Irrigation (per field, per crop)*

Field name:_____Acres:_____Slope of field:_____(%)

Condition of field at the end of the furrows:

❑ Less than 6 inches from field level grade to bottom of tail water ditch

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Delivery Method: ❑ Gated pipe ❑ Siphon tubes ❑ Earthen ditch with cutouts

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Time to reach end of furrow:_____ (hrs) Furrow flow rate:_____ (gpm) *OR*

Gated pipe: Width of opening:_____ (in) Height of opening:_____ (in)

Elevation difference between head ditch water surface and gate:_____ (in)

Siphon tube: Tube diameter:_____ (in) Number of tubes per furrow:_____

Elevation difference between head ditch water surface and furrow:_____ (in)

Set time for single furrow run:_____ (hrs)

Days between irrigation:_____